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09/607,403	06/30/2000	Ashfaque Chowdhury	34769-187604	9903

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EXAMINER	
BRODA, SAMUEL	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/607,403	Applicant(s) CHOWDHURY ET AL.	
	Examiner Samuel Broda	Art Unit 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3, 5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-34 have been examined.

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicants' cooperation is requested in correcting any errors of which Applicants may become aware in the specification.

Claim Objections

4. The following is a quotation of 37 CFR § 1.75:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

4.1 Claim 16 is objected to under 37 CFR § 1.75(a) because the term "the product of the volume of all items on the list of items to be packed and one plus one minus a maximum fill constraint divided by the minimum number of cases required for packing the items in the list of items to be packed" is difficult to parse. Correction is required.

Based on the formula description at Specification page 28 lines 4-6, a suggested replacement for the entire claim is:

--The method of claim 1 wherein the desired average volume per case equals A*B / C,

where:

A = the total volume for the items on the item list,

B = 1 + (1 – maximum fill constraint), and

C = the minimum number of cases required for packing the items in the list of the items to be packed.--

Claim Rejections - 35 U.S.C. § 112, First Paragraph

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5.1 Claims 1-34 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5.2 Regarding independent claim 1, this claim includes the step "(d)" of "selecting a case to be packed with one or more of the items in the list of items to be packed, wherein the

selecting the case comprises determining a desired average volume per case and selecting the smallest of the cases available to be packed that comprises a volume in excess of the average volume per case."

After the case selection step "(d)", in step "(e)" a configuration of items to be placed in the case is determined, and finally in step "(f)", steps "(d)" and "(e)" are repeated if items remain to be packed.

These method steps do not appear to handle situations where an item on the list is larger than the smallest of the cases available that comprises a volume in excess of the average volume per case. In this situation, the method steps become an endless loop.

Consider the following example:

Item	Weight	Volume
"Small"	2	2
"Big"	100	100

Case	Volume
"Small"	75
"Large"	130

Constraint	Value
Maximum weight constraint	200
Item constraint	3
Max fill constraint	.65

Using these values, and performing the calculations described in Fig. 3, the minimum number of cases equals 2. Performing the calculations described in Fig. 4, the desired average volume per case is then calculated as:

102 * (1 + 1 - .65) / 2, which approximately equals 68.9.

The smallest of the cases available to be packed is selected as the "Small" case having a volume of 75. This case will never accommodate the "Big" item, and steps "(d)" through "(f)" will form an endless loop. The Specification does not appear to address this type of problem.

Taken as a whole, only with undue experimentation could one reasonably skilled in the art make and/or use the invention, because of the omissions in the subject matter described in the Specification.

5.3 Dependent claims not specifically described above are rejected based on their dependency to a rejected claim.

Claim Rejections - 35 U.S.C. § 112, Second Paragraph

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6.1 Claims 1-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

6.2 Regarding independent claim 1, this claim is directed to "A method of optimized placement of items in a bounded region" (emphasis added) but the neither the claims nor the Specification appear to describe what type of variable is being optimized by the claimed method.

6.3 Claims 1-16 and 27-30 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are the steps that comprise step "(e)" of "determining the configuration of placement in the case to be packed of items in the list of items to be packed."

6.4 Dependent claims not specifically described above are rejected based on their dependency to a rejected claim.

Claim Rejections - 35 U.S.C. § 101

7. The following is a quotation of 35 U.S.C. 101:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7.1 Method claims 1-34 are rejected for reciting a process that is not directed to the technological arts.

Regarding claim 1, this claim is directed at a method of optimized placement of items in a bounded region. To be statutory, the utility of an invention must be within the technological

arts. *In re Musgrave*, 167 USPQ 280, 289-90 (CCPA, 1970). The definition of "technology" is the "application of science and engineering to the development of machines and procedures in order to enhance or improve human conditions, or at least to improve human efficiency in some respect." (Computer Dictionary 384 (Microsoft Press, 2d ed. 1994)).

The limitations recited in claim 1 contain no language suggesting that claim 1 is intended to be within the technological arts.

7.2 Claims 2-34 are dependent on claim 1 and rejected using the same analysis.

Claim Rejections - 35 U.S.C. § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> . . .
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.1 Claims 1-4 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al, "An Analytical Model for the Container Loading Problem," European Journal of Operations Research, Vol. 80 No. 1, pp. 68-76 (January 1995).

8.2 Chen et al teaches a general model of the container loading problem using a linear mixed integer programming model for packing "containers" (corresponding to Applicants' "items") into "cartons" (corresponding to Applicants' "cases"). See Chen et al, Section 2 pages 70-73. The model of Chen et al is "guaranteed to lead to an optimal solution" with the optimal

solution allocating containers into cartons and minimizing the unused space. Chen et al, Section 2 page 70 paragraphs 1-2.

8.3 Regarding claims 1 and 16, the broadest reasonable interpretation of each claim does not require that the cases available for packing comprise more than one size. If these cases are identical in size, then the case selection step "(d)" becomes irrelevant and thus adds no patentable weight to the claim.

In this situation, the analytical model of Chen et al satisfies the remaining steps. In particular, the method of Chen et al comprises a method of optimized placement of items in a bounded region, comprising:

(a) examining an order comprising a list of items to be packed [inherent in providing input to the linear mixed integer programming model];

(b) determining the cases available for packing [inherent in providing input to the linear mixed integer programming model];

(c) determining the minimum number of cases required for packing the items in the list of items to be packed [minimum number of cases determined by solution of the linear mixed integer programming model];

(e) determining the configuration of placement of items in the case to be packed of items in the list of items to be packed [minimum number of cases determined by solution of the linear mixed integer programming model]; and

(f) if the list of items to be packed is not empty, repeating steps (d)-(e) [every item on list of items to be packed is placed in a case; linear mixed integer programming model iterates steps until solution is found].

Therefore, the method of Chen et al anticipates claims 1 and 16 under the broadest reasonable interpretation wherein cases are identical in size.

8.4 Regarding claims 2 and 3, the quantity of cases and the case types are inputs to the linear mixed integer programming model.

8.5 Regarding claim 4, the model of Chen et al can be modified for controlling weight imbalance in the container. See Chen et al at Section 3 page 73 paragraph 3.

Claim Rejections - 35 U.S.C. § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9.1 Claims 15 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al, in view of common knowledge regarding packing items.

9.2 Regarding claims 15 and 27-30, the method of Chen et al does not appear to explicitly teach the handling of pre-packaged cases, the preparing of a deliverables data file, and

the printing of data on a pick label. Official Notice is taken that these steps are old and well known in the packing and shipment of packages. Such steps are necessary to deliver packed cases using the standard delivery services such as the Postal Service, the United Parcel Service, and Federal Express.

It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to incorporate these steps into the model of Chen et al, because the information placed on the packages would permit them to be shipped using standard delivery services.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure. Reference to Raidl et al, "Genetic Algorithms for the Multiple Container Packing Problem," Lecture Notes on Computer Science, Vol. 1498, pp. 875-884 (September 1998), is cited as teaching use of different genetic algorithms for solving multiple container packing problems.

Reference to Fekete, "A New Exact Algorithm for General Orthogonal D-Dimensional Knapsack Problems," Universität zu Köln (1997)(paper available at:

http://citeseer.nj.nec.com/fekete97new.html),

is cited as teaching a two-level tree search algorithm for finding exact solutions for the d-dimensional OKP.

Reference to Chua et al, "Constraint-Based Spatial Representation Technique for the Container Packing Problem," Integrated Manufacturing Systems, Vol. 9 No. 1, pp. 23-et seq (1998), is cited as teaching a spatial representation technique using spatial matrices in conjunction with a set of heuristic rules to match boxes to empty volumes in a container.

Reference to Scheithauer et al, "A Heuristic Approach for Solving the Multi-Pallet Packing Problem," Dresden University of Technology (May 1996)(paper available at:

http://citeseer.nj.nec.com/scheithauer96heurisitic.html),

is cited as teaching the combination of heuristic rules with a branch and bound strategy.

Reference to Pisinger, "Algorithms for Knapsack Problems," Ph.D. Thesis, University of Copenhagen (February 1995)(paper available at:

http://citeseer.nj.nec.com/pisinger95algorithms.html),

is cited as teaching an overview of algorithms used to solve knapsack problems.

11. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (703) 305-1026. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

SAMUEL BRODA, ESQ.
PRIMARY EXAMINER